



The Dryden X-Press

# X-tra



# IceBridge

Monitoring and recording of ocean-ice status and icebergs near the North and South poles is ongoing





X-tra

**Cover**, icebergs, like these in Baffin Bay between Canada and Greenland’s west coast, were among features recently observed with NASA’s DC-8, bottom left, and P-3B, bottom right, on separate missions.



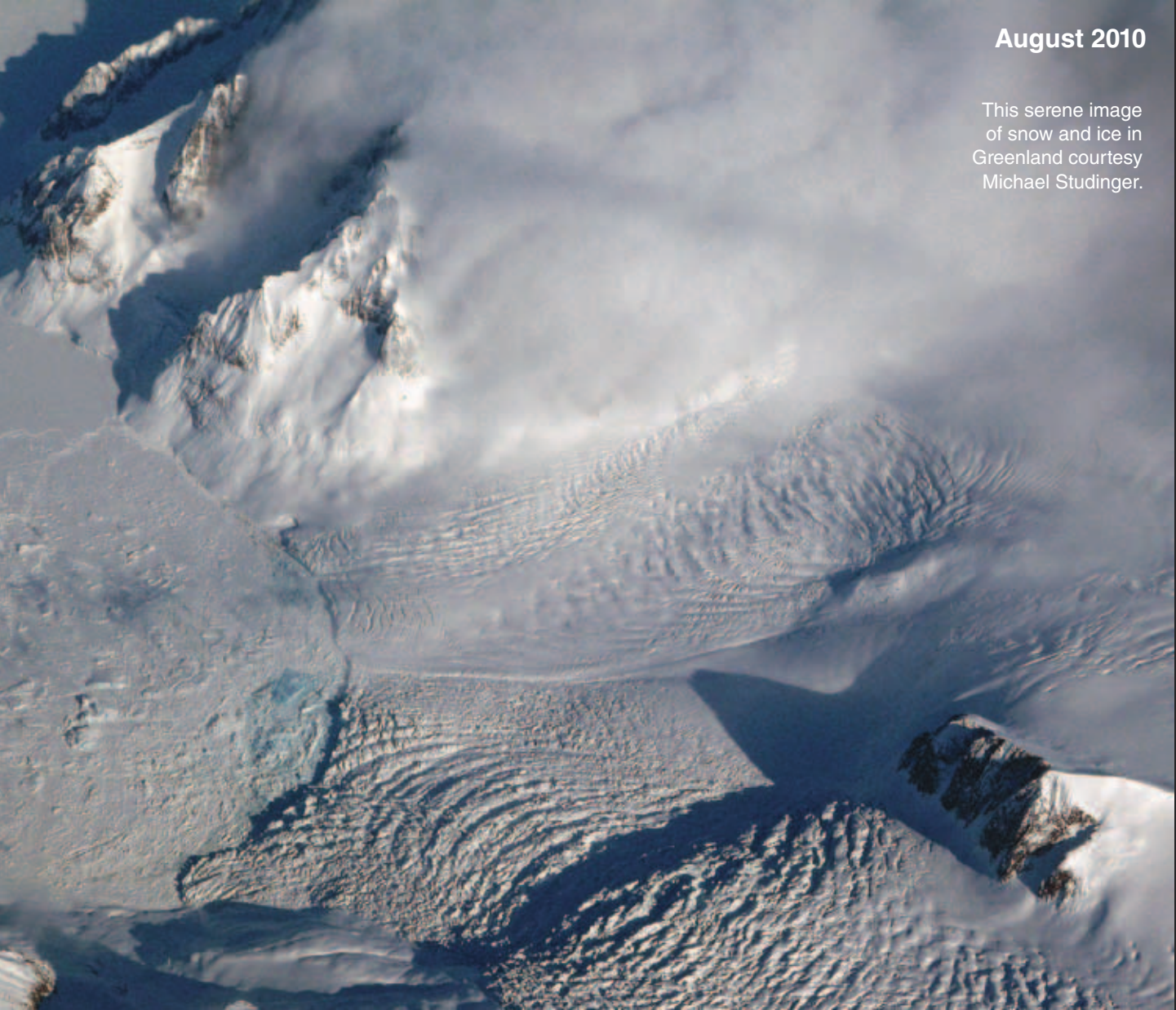
**Above**, an IceBridge crew at work aboard the DC-8.

**At right**, this scenic view of Greenland’s icy cliffs was captured by Operation IceBridge mission scientist Michael Studinger of Columbia University.



August 2010

This serene image of snow and ice in Greenland courtesy Michael Studinger.



**By Jay Levine**  
X-Press Editor

A NASA DC-8 crew is preparing for a mission that continues the most extensive airborne survey ever made of Earth’s polar ice. The mission is part of an overall campaign known as Operation IceBridge that is expected to provide an unprecedented, three-dimensional view of Arctic and Antarctic ice sheets, ice shelves and sea ice. Mission flights provide a yearly, multi-instrument look at the behavior of the rapidly changing features of Greenland and Antarctic ice. The P-3B, based at Goddard Space Center’s Wallops Flight Facility in Virginia, flew the first of the IceBridge missions during the spring of 2009 over Greenland. Later that year, the DC-8 flew its first IceBridge mission over Antarctica. Other, smaller airborne surveys being made around the world are also part of the campaign. Based at the Dryden Aircraft Operations Facility in Palmdale, Calif., the DC-8 aircraft and crew are getting ready for a five-week mission, which will begin in October and is expected to include about a dozen flights, said Chris

Fast facts

- IceBridge is the largest airborne survey ever made of Earth’s polar ice.
- IceBridge is expected to provide an unprecedented, three-dimensional view of Arctic and Antarctic ice sheets, ice shelves and sea ice.
- Up next for the IceBridge campaign is DC-8 flights from Chile that will build on a mission flown last year to monitor sea ice and ice shelves in the Antarctic region.

Jennison, Dryden DC-8 mission manager. This portion of the IceBridge campaign includes flights from Chile that will build on a mission flown last year to monitor sea ice and ice shelves in the Antarctic region. “We’re fulfilling the role of a satellite,” Jennison said. Operation IceBridge research will help prevent a gap in polar observations made with NASA’s Ice, Cloud and Land Elevation Satellite, or ICESat – in orbit since 2003 – and ICESat-2, scheduled for launch in late 2015. As ICESat neared its retirement in 2009, IceBridge became critical for ensuring

a continuous series of observations, according to NASA scientists. “The overall purpose of this mission is to complete another chapter in the IceBridge campaign until the next ICE satellite can be launched,” Jennison explained. “The ICE satellite is intended to be a part of the earth-science observing system. “ICESat was one of the ‘A-train’ satellites that was monitoring Earth’s ice sheets as a function of climate health,” he said, referring to a constellation of NASA satellites that are flown in formation. “When the primary measurements on that satellite failed – those were lasers that measured exactly how much ice is present in the northern and southern polar regions [the Arctic and Antarctic] as well as in larger glaciers globally – it was a loss.” Using NASA aircraft was one way to avoid losing a tremendous amount of trending information until the next satellite is operational and can be used to gauge the pace of climate change, Jennison said. Climatologists are interested in the rate of the loss of Greenland’s ice sheet. The purpose of the recently concluded

mission was to continue ongoing monitoring of Greenland’s sea ice and ice sheets. As part of NASA’s Cryosphere program, remote sensing plays a key role in characterizing the world’s major ice sheets due to their size and the scale of change they undergo. Gathering information about the size and thickness of ice sheets of Greenland and Antarctica will allow researchers to develop predictive models of the ice sheets and their impact on sea level change. A related mission concluded in Greenland earlier this summer when the DC-8 flew more than a dozen missions before transferring key equipment to the Goddard-based P-3B aircraft. A Goddard aircrew carried out a second phase of that mission but will not participate in the upcoming Chilean flights. During the Greenland mission, another first was recorded. On April 10, 2010, the European Space Agency CryoSat-2 satellite, launched just weeks earlier, passed over the DC-8, marking the first-ever under-flight of the new ice-





Photo courtesy Dick Ewers

Crews prepare the DC-8 at Thule Air Base, Greenland, for an eight-hour Operation IceBridge mission to measure Arctic sea ice.

## IceBridge ... from page 3

observing satellite. Another use of NASA environmental aircraft is to provide support for calibration of satellite instruments.

Mike Cropper, P-3B mission manager and aircraft engineer, said all of the science objectives were reached on the P-3B portion of the summer Greenland mission.

Cropper explained that the P-3B flew 13 six-to-eight-hour science flights in 24 days. Going to Greenland was a highlight of the mission, he said.

“I really liked being able to fly up and down the fjords and glaciers and see sights few people get to see,” he

said. “Some of the sheer cliffs of the southeast coast were breathtaking. I’ve seen pictures of this before, but they don’t do it justice. When we flew south of Thule [Air Base in Greenland] on the western coast, we could see seals and polar bears on the ice.”

The instrument racks used in the DC-8 and P-3B are of similar size, allowing for transfer of rack equipment between the two aircraft. Both also have similar instrument ports that allow for transfer of experiments with minimal modifications.

The mission marked another achievement for

Cropper and the P-3B aircraft.

“It was my first deployment. I’m usually working on the engineering and this time I also was involved in mission management,” he said.

Cropper was particularly impressed with the engineering and installation of wing-mounted radar antennas and radar suite used on the P-3B, which were developed by the University of Kansas with NASA oversight and support. Along with the three mounted bomb-bay radar antennas, the entire radar suite was designed,

analyzed, manufactured,

reviewed and flight-tested in six months.

The antennas were the largest structures mounted to the NASA P-3B aircraft to date, he added. The two wing-tip antennas were 10 feet long and the under-fuselage antenna was 17 feet long.

At least until the new ICESat is launched and operational, the NASA aircraft being used for environmental study will fill the gap in providing climate information. NASA officials hope the studies will give insight on global environmental concerns and the rate at which they are developing.

X-tra is published for civil servants, contractors and retirees of the Dryden Flight Research Center and the center’s partners and civil customers.

Address: P.O. Box 273,  
Building 4839  
Edwards, Calif. 93523-0273  
Phone: 661-276-3449  
FAX: 661-276-3566

Editor: Jay Levine, Tybrin, ext. 3459

Assistant Editor: Sarah Merlin, Tybrin, ext. 2128

Managing Editor: Steve Lighthill, NASA

Chief, Strategic Communications: John R. O’Shea

[www.nasa.gov](http://www.nasa.gov)